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SAFETYZONE

MAGAZINE

Vol. 19 Issue 8

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Safety Zone Magazine™ is published six times a year on a bi-monthly basis by CJS Media, P.O. Box 1568, Pelham, AL 35124 USA. *Safety Zone Magazine™* is distributed free to qualified subscribers. Non-qualified subscription rates are \$57.00 per year in the U.S. and Canada and \$84.00 per year for foreign subscribers (surface mail). U.S. Postage paid at Birmingham, Alabama and additional mailing offices.

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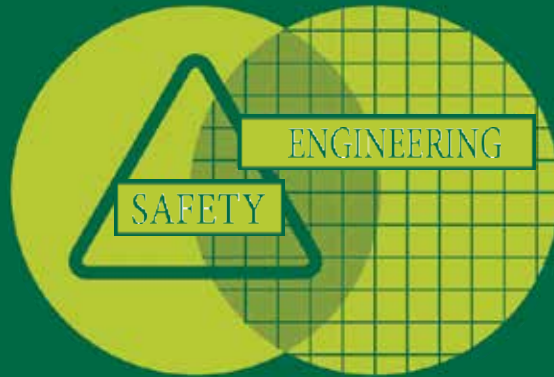
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By Diego Barrera
Director of professional services
for Skyward, A Verizon company

How to Report a Drone Incident at Your Company

Drones have become an essential tool for energy companies and utilities, used for everything from pipeline inspections to 3D mapping to volumetric calculations to stringing wire to repair downed power lines. Improved workforce safety and risk reduction are two key factors driving the rapid adoption of drones in the energy sector.

But it's likely that even the best-run corporate drone programs will one day have a ground or flight incident: an equipment failure, a close call, a collision, a pilot injury, or maybe even a trespass into restricted airspace.

Does your company have internal reporting procedures to follow when it does? Every large energy enterprise flying UAS needs a policy that spells out what happens when there's an incident, just as airlines have reporting protocols for any breach of normal flight operations.

As the head of professional services at Skyward, I've defined four best practices to help companies report commercial drone incidents within their organizations. This article outlines optimal procedures to implement and follow:

- Create clear guidelines on instances that require reporting.
- Define the incidents that don't need to be reported.
- Specify who gets notified when there's an injury.

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- Create actionable reports, so your UAS program can continually improve.

Why it's important to document and report drone incidents

A spirit of transparency around incident reporting starts with UAS managers. These leaders set the drone culture—for better or for worse—and it's their job to make sure that people feel comfortable coming forward if something happens and the UAV team learns from any mistakes. Start by making sure the full team understands why reporting flight incidents is essential:

- The company can't protect itself—from embarrassment or liability—if management doesn't know what happened. It's smart to head off surprises, and it will help you retain executive support for the program.
- Unreported mistakes make it difficult to uncover any systemic flaws with equipment or operations. Pilots condemn their colleagues to repeating the same errors if managers can't identify patterns. Sometimes, the remedies are a question of simple fixes, like better battery management, better pilot training, or an extra step in a pre-flight planning checklist.
- Record what happened and allow for honest fact finding to enable continual improvement.
- Honesty is also important to protect the employees involved. If something happens and people in authority find out about it only after it's become a real issue, this jeopardizes the program's success.

Best practice 1: Develop guidance on what should be reported

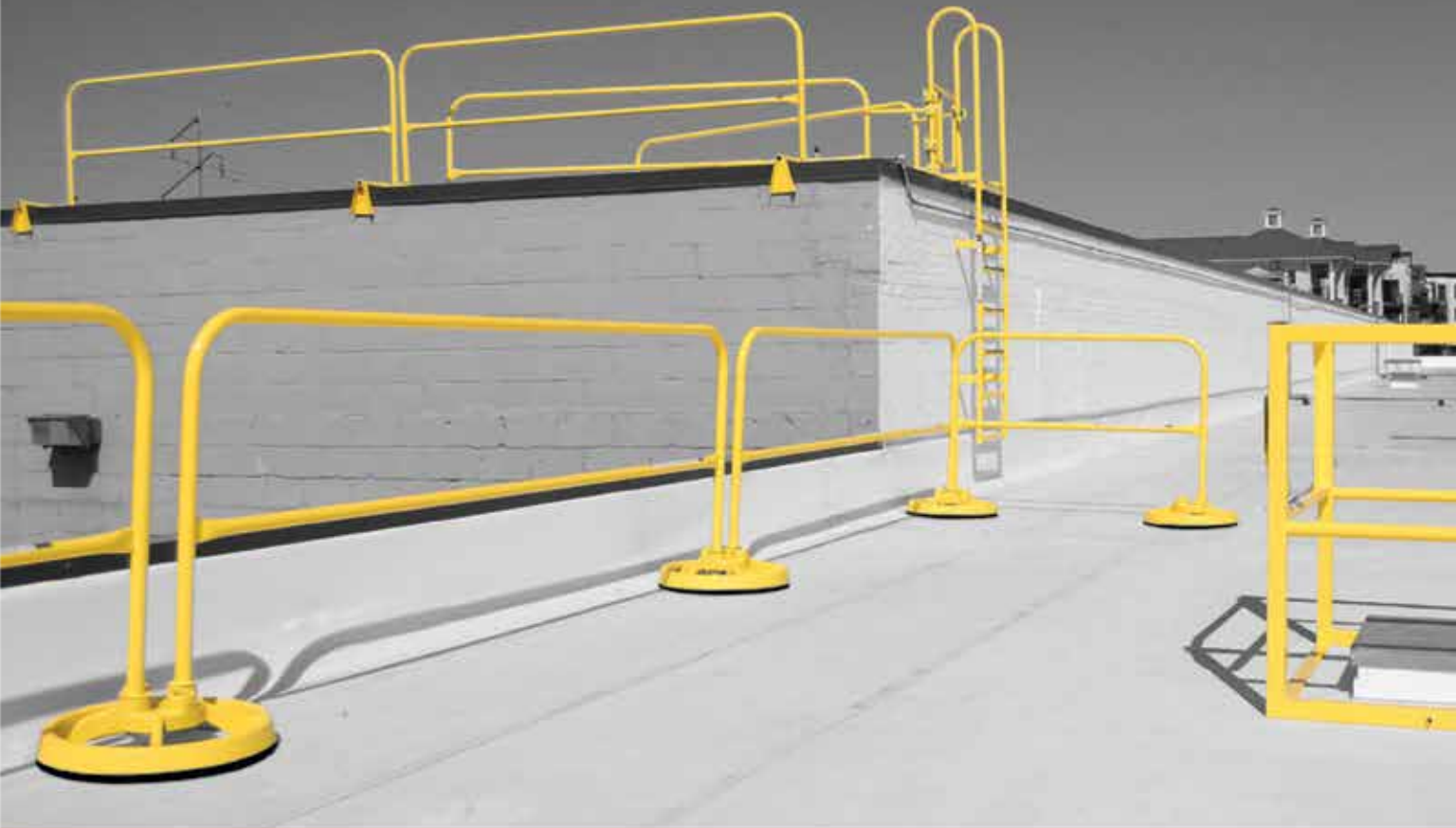
There are both ground and flight incidents to consider in terms of internal reporting, including:

- Battery fires in the office
- Significant drone hardware failures (faulty propellers, early wear)
- Collisions with any structures
- Crashes
- Complaints due to flights that occur over people



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- Injuries to your UAS team or bystanders caused by drone equipment

A typical reporting policy may read something like this:

Any accident or incident which meets the following criteria must be reported to the UAS Manager within 72 hours:

- Any injury to a third-party
- Any injury requiring more than first aid to a participant in the operation
- Any noticeable damage to property other than the UAS
- Substantial damage to or loss of company-operated or company-owned UAS

Best practice 2: State what type of incidents don't need to be reported

No one likes a fuss over nothing. So tell your team which incidents don't need to be reported. Also include guidance on what should go through your existing occupational safety reporting system, for example, a car accident on the way to the flight area. But if a propeller breaks, the drone is still airworthy, and you can repair it in the field, high-ups probably don't need to be bothered.

The UAS manager or responsible person should be the one who determines whether or not higher level reporting is required either to the FAA or to company leadership. Threshold limits for mandatory reporting vary by company. Incidents involving less than \$1,000 of damage may not be worth it for some organizations to report internally. As you're deciding on your policy, make sure it encourages full reporting whenever there's a possibility that there may be an underlying operational issue at play. Just log the issue in your flight software (e.g., Skyward) so maintenance can be tracked as usual.

Best practice 3: Document who to notify when there's an injury

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It goes without saying, but I'll say it anyway: If the drone incident involves an injury that requires more than first aid, call 911.

If your company has a safety or compliance office with an existing policy for reporting company accidents, that policy should be uploaded to your drone operations software for easy reference when there's an injury. If no such protocols exist, check your software for an accident response checklist as a starting point.

Your company policy should also specify who needs to be notified about drone-related injuries, for example:

- The site supervisor at the client job site, if there is one
- The chief pilot or UAS manager at your company
- The occupational safety or compliance department at your company
- The FAA, if the incident has caused a serious injury to any person or any loss of consciousness, or more than \$500 in property damage other than the UAS
- Others who make sense; for example, if the police or fire department is involved

Best practice 4: Use reporting to prevent future incidents

Reports that only describe what happened without pinpointing the causes and creating accountability for fixes aren't productive. Here's how an incident report can serve as a tool for heading off recurring problems:

- The incident report should attribute the accident to specific factors. Each factor should have a recommendation for how to improve and to whom it's assigned, along with a due date for taking action.
- Divide responsibilities for creating and responding to the report. The person who does an incident investigation should not necessarily be the same person who is charged with holding people accountable and following through on report recommendations. Keeping these assignments separate will help assure you get an impartial

investigation. The resulting report can then be handed off to someone in the chain of command who can serve as a strong, unbiased advocate for implementing any recommendations.

Sample Incident Investigation and Reporting Policy

Once you've established your incident reporting protocol, be sure to add it to your drone operations software platform so you have quick access when you need it.

If your UAS operation is small and you need to do it yourself, here's a sample policy as a template.

The UAS manager is responsible for ensuring that an internal accident safety report is completed within 21 calendar days of notification of any accident involving the company's aircraft when:

- The aircraft is destroyed, lost, or substantially damaged (ie, damage or failure which negatively affects the structural strength, performance, or flight characteristics of the aircraft. This type of damage would normally require major repair or replacement.)
- There is any injury to a third party
- There is any injury to a [Company Name] staff member which requires more than first aid or results in a loss of consciousness
- There is claimed damage to the property of a customer caused by the operation
- There is claimed damage to the property of a third-party caused by the operation

Accident/Incident Reporting

National reporting requirements

1. The manager responsible for UAS operations will ensure that national accident or incident reporting requirements are met. Details may be found in the national requirements section of this policy.

Internal Reporting

1. Regardless of national requirements, the UAS must be notified whenever there is any accident or incident involving a Company owned or operated UAS which:



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1.3. Aircraft Damage: Substantially damages or destroys a UAS owned or operated by Company; or

1.4. Damage to Non-Company Owned Property: Causes noticeable damage to non-Company owned Property.

Safe commercial drone programs are built on aviation best practices. These practices are geared toward rigorous, standardized and repeated processes and a spirit of inquiry. Keep this in mind as you set up your organization's standards for notifying company management of drone incidents. Don't think of it as a punitive system, but as an integral part of your successful UAS program.

Diego Barrera is an FAA Part 107-certified drone pilot and director of professional services at Skyward, a Verizon company. He works with companies to set up safe, efficient drone programs and train drone pilots. Reach him by contacting Skyward's professional services team at contact@skyward.io.





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Tips for Keeping Warehouses and Distribution Centers Safe, Compliant, and Productive

As regulations change and warehouse requirements become more complex, partnering with an expert can help to ensure durable, cost effective, compliant storage rack

While it was once common for the majority of warehouse managers to purchase standard storage racks that could be “quick-shipped” from rack manufacturers’ stocked inventory, this is occurring less often as racking becomes more specialized and regulations stricter.

Today, storage rack systems are generally considered a building-like element, so are often subject to a variety of federal, state, and local regulations. These ordinances are continuing to evolve – perhaps none more so than seismic standards – and can become a pitfall for warehouse managers unfamiliar with them.

As a consequence, warehouse managers should seek expert guidance from a qualified design professional whenever the racking, foundation, or warehouse infrastructure must accommodate unusual stress, loading, function, or other non-standard factors.

“Ordering quick-ship pallet racks is convenient, but should be limited to use with non-flammable, non-hazardous product stored inside buildings in low-risk seismic regions,” says Arlin Keck, an engineer at Steel

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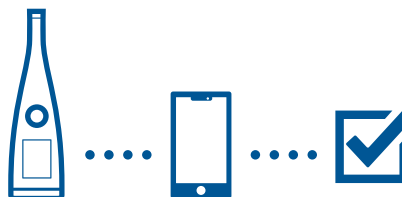
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King Industries, a designer and manufacturer of warehouse storage racks, pallet racks and material handling/safety products since 1970.

“Usually, with quick-ship racks, there is a maximum pallet load limit that the racking can handle and a maximum bay load limit that the racking and the existing warehouse floor can handle. There is also usually a six-to-one height-to-depth ratio placed on the racking,” adds Keck. “Any rack outside of these parameters typically requires a qualified design professional’s review.”

Even when the quick-ship rack is appropriate for a warehouse, there may be a need for expert input if there are special circumstances – for example, if rack installation occurs on a sloping floor.

Despite greater warehouse complexity and evolving regulations, understanding a few key distinctions about racking will help warehouse managers to keep their facilities cost effectively safe, compliant, and productive.

Among the key distinctions to understand are seismic standards and environmental concerns for rack-supported buildings. Engineered systems such as pick modules, elevated platforms, and automated storage and retrieval systems (AS/RS) also have their own engineering issues like travel distance, means-of-egress and means-of-access requirements, as well as safety protection and guarding.

Seismic and Environmental Issues

Because storage racks are considered building-like structures according to the International Building Code, and are represented as such in the Rack Manufacturer’s Institute (RMI) Standard, racks need to be designed to the local seismic requirements just like a building.

Since the RMI is the recognized U.S. specification for the design, testing and utilization of industrial steel storage racks, responsible warehouse managers will want their racks to meet this recognized standard for seismic design.



RMI created the R-Mark Certification Program as a way for storage rack users to clearly identify those rack manufacturers whose components and design are in accordance with the RMI Specifications. Steel King is one of a select number of rack manufacturers that holds an active R-Mark License, and is a licensed fabricator in Los Angeles County, which has some of the strictest seismic codes in the nation.

While all U.S. states have some potential for earthquakes, 42 of the 50 states have a reasonable chance of experiencing damaging ground shaking from an earthquake in 50 years, which is generally considered the lifetime of a building.

Another reason for warehouse managers to seek a design professional’s input is the fact that seismic zone designations are changing. The United States Geological Survey (USGS) uses ground acceleration values, referred to as Seismic Design Categories (SDC) from A to F.

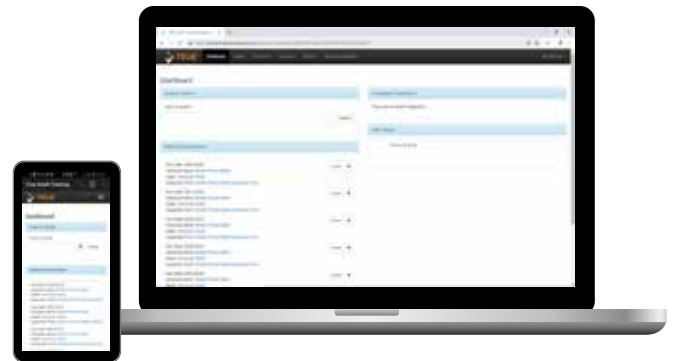
With seismic requirements increasing in many parts of the country and with a better understanding of structural performance during an earthquake event, these standards will continue to evolve, placing more demand on the rack design.

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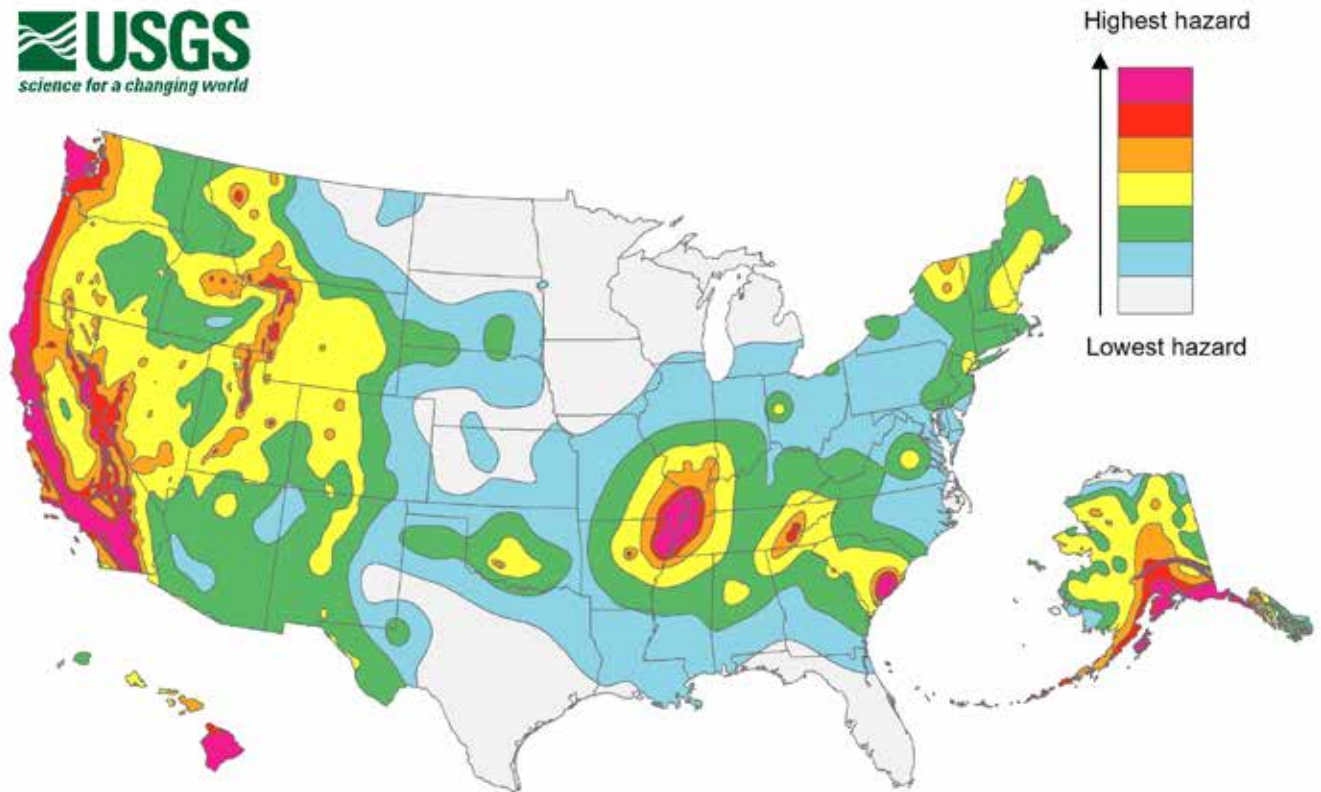
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"Seismic separation is another requirement for racks placed within an existing warehouse," says Keck. "This means the rack needs to be a certain distance away from the building columns so they will not collide during an earthquake. In high seismic regions, special inspection is typically required. An independent inspector will watch the installation and verify proper bolt tightening, especially the anchor bolt, along with checking for rack damage and missing or poor welds."

Outdoor racking as well as rack-supported structures must also be designed to account for wind, rain, and snow loads.

In hurricane prone regions, for example, outdoor rack and rack-supported structures must be designed to withstand the force of high-speed winds in addition to standard product and dead loads.

When heavy snowfall is prevalent, the outdoor rack and rack-supported structures must accommodate

the accumulated weight of both snow and snow drifts, which occur when wind pushes snow up against taller structures or towers.

In all such unusual environmental conditions, of course, it is essential to consult with a professional about incorporating necessary safety factors into the rack design.

Engineered Systems including Pick Modules and AS/RS Structures

By definition, an engineered system is any non-standard storage rack that requires special design considerations. This can include a variety of rack types and safety equipment that is semi-customized or actually custom-designed specifically to the warehouse application.

Safety

In terms of safety, racking of course must be designed for any unusual stresses, loads, or functions placed upon it. It must also meet applicable fire

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codes and insurance requirements. For instance, racking loaded with flammable products would require certain accommodations to assure adequate fire detection, containment, and suppression.

Some of the most highly engineered systems actually involve pick modules, elevated platforms, and work platforms. In such engineered systems, a number of key factors must also be addressed to ensure safety, compliance, and permitting, according to Keck.

“To comply with the fire code, you need to address the means-of-egress (the path to exit a building), travel distance, and head clearance/exit width,” says Keck. “This is based on the number of people who have to evacuate the racking system.”

In order to provide safe access and fall protection, the placement of suitable stairs, ladders and guarding should also be implemented throughout the engineered system.

Because dropping off pallets or equipment at elevated levels may be needed as well in such engineered systems, providing for safe drop zones, through an opening in the side railing to allow easy receipt, should be properly planned too.

Serviceability

Ensuring that the engineered system functions as designed and that the employees working on an engineered rack structure feel comfortable is another consideration. Generally, this is referred to as serviceability. The term refers to how certain structural elements like elevated walkways must provide the desired support and stiffness for walking or cart use without unacceptable flex (bounce) or sway.



While such engineered systems require substantial input from a design professional, AS/RS structures – which can be over 100 feet tall and bear loads greater than 100,000 lbs. per storage bay – require even more planning and integration.

In today's warehouse environment, AS/RS systems are increasingly popular in big box store distribution centers and large freezer companies for their ability to provide very high volume, high turnaround storage with minimal labor.

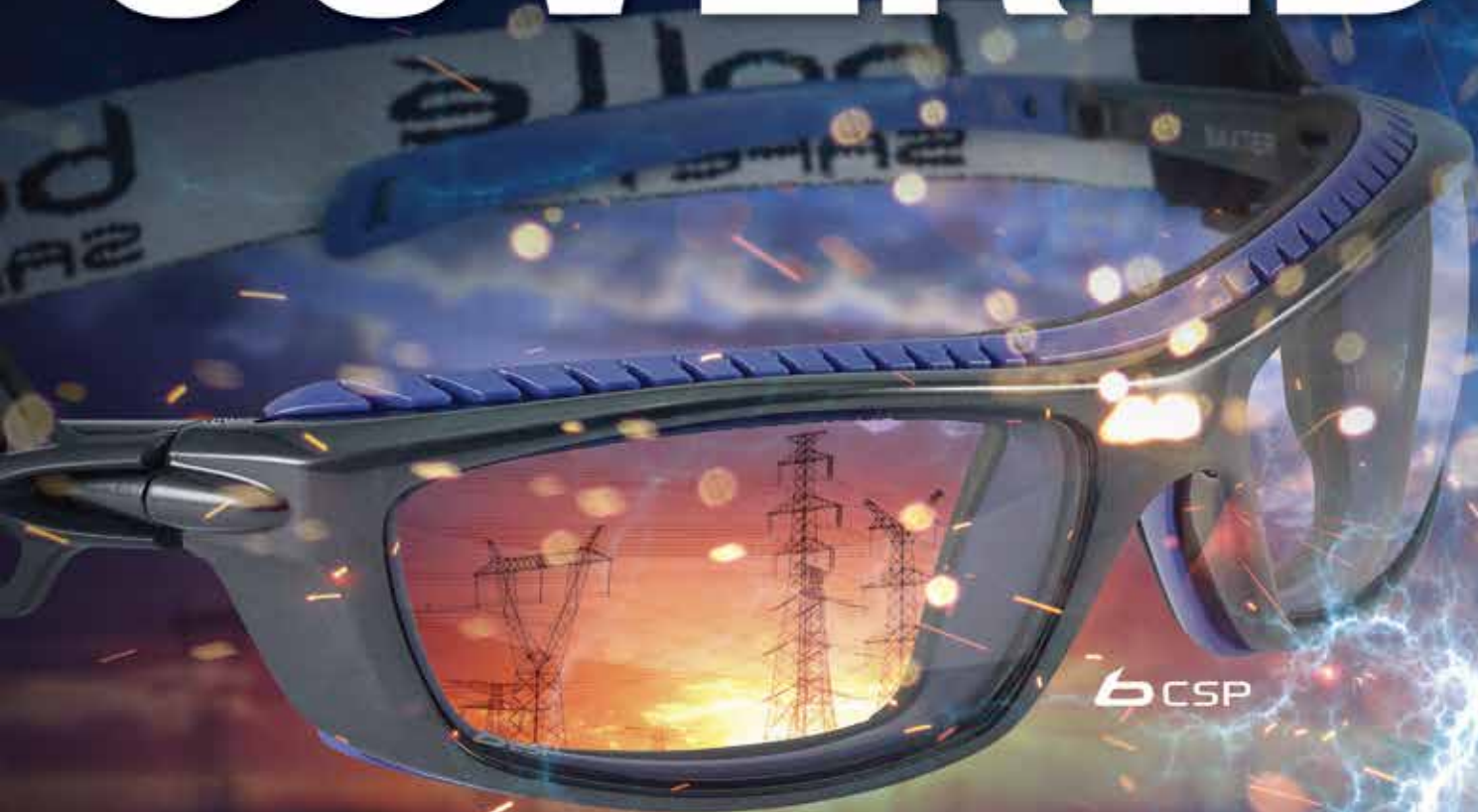
“With AS/RS systems, there is a lot more interfacing between the equipment and the racking,” says Keck. “Because these systems use automated cranes and usually map each location on a coordinate plane via computer, the tolerances are a lot tighter.”

“Since the machines stop at precise locations, each opening has to be at the exact location,” adds Keck. “So, the racking must be very stiff and the rack must be straight and plumb.”

Quick-ship or Engineered Rack?

While there is no denying that purchasing quick-ship

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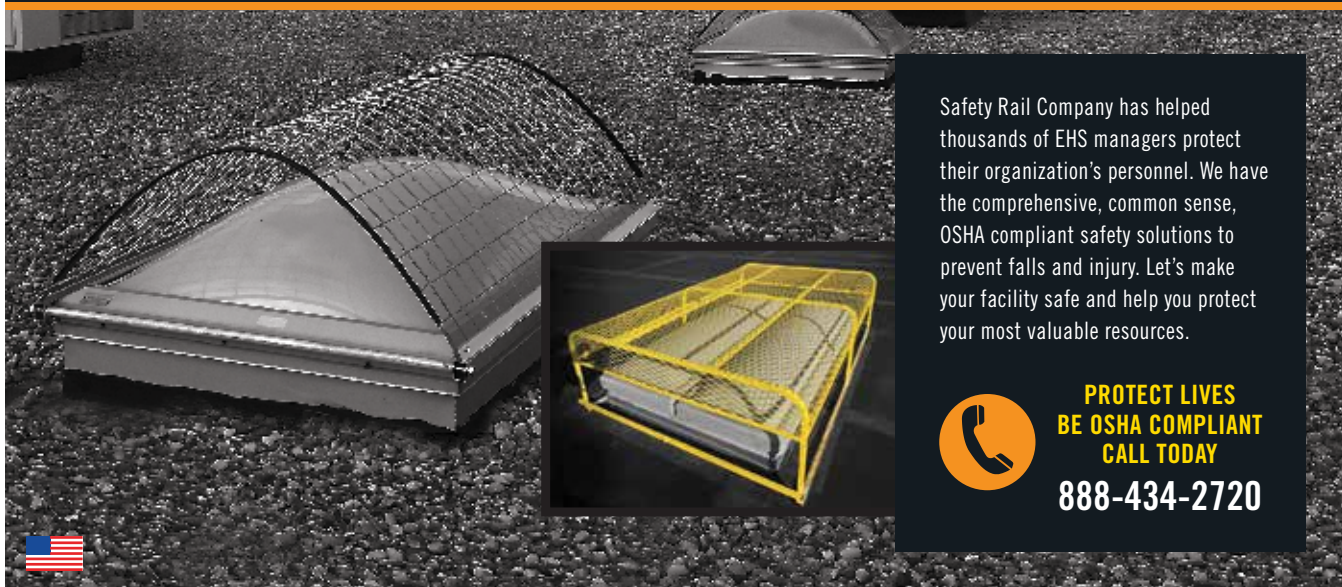
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racking is convenient for many standard applications, the truth is that many larger, more complex warehouse applications today require expert input from a design professional. This is almost always the case when it is necessary to coordinate with integrators as well as various safety and trade professionals under deadline. Troubles often occur when someone decides that it is quicker and cheaper to buy quick-ship racking when the application really calls for an engineered system.

So, when optimal storage, material flow, safety and compliance is required in a warehouse, proactive managers will get the help they need up front to avoid costly surprises, delays, or retrofits.

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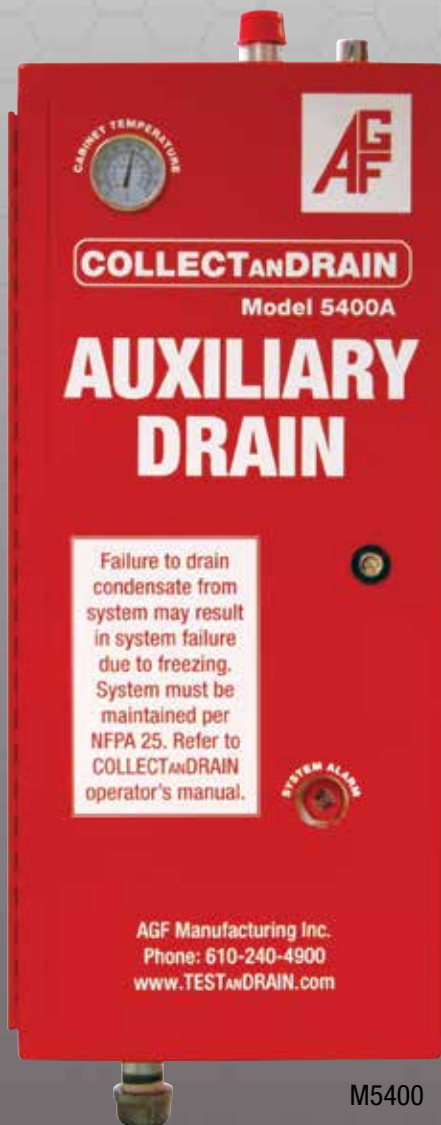
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